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WHEN IS VICE NICE FOR INVESTMENT PORTFOLIOS FROM A QUANTITATIVE PERSPECTIVE?

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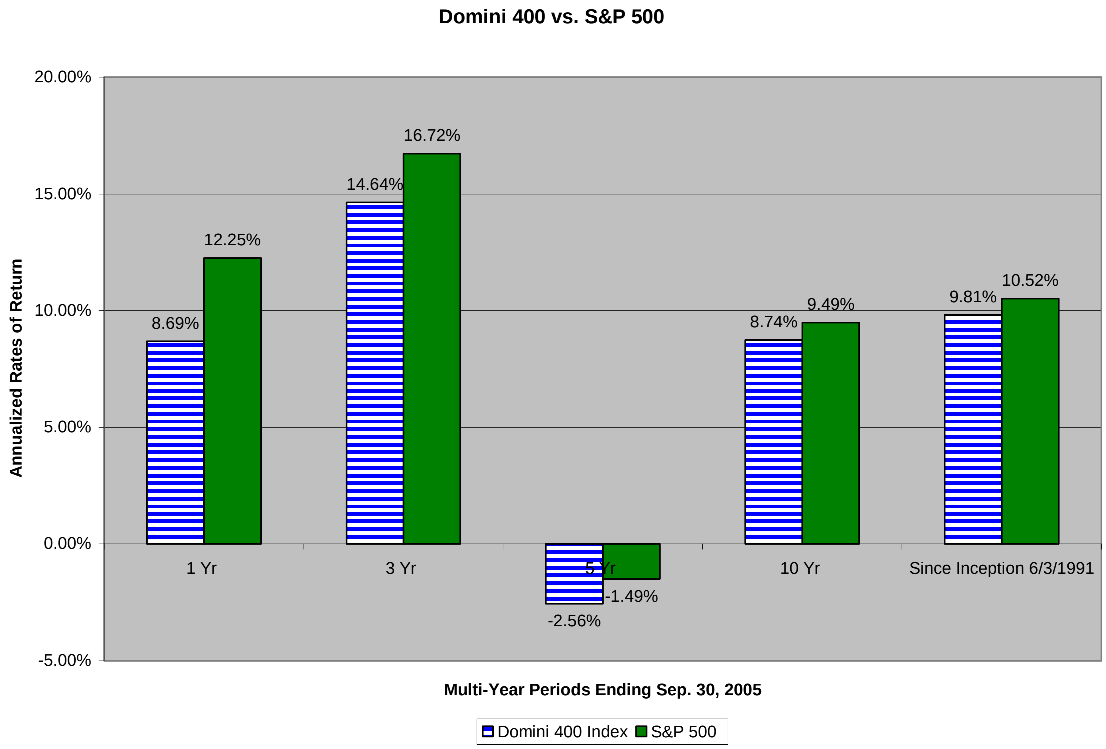
"*To everything, there is a season*." That quote is from the Biblical book of Ecclesiastes, but generally applies equally well to the investment universe. At various times and with variegated economic and political environments as backdrops, different industry groups tend to fall in and out of favor with investors. Moreover, this tends to happen in both bull and bear markets.

To listen to the marketing arms of some so-called "socially responsible" investment ("SRI") funds, however, one might conclude that the stocks of companies in certain sectors they shun are never in favor. Several of these funds entirely eliminate certain industry and sector groups from the investment manager's selection set and claim that the elimination of such companies helps enhance investment performance, making it possible for investors in such funds "to do well and to do good" at the same time.

Writing for a quantitative consulting firm, we will not comment on whether one is helping to promote good principles by avoiding the stocks of companies in these selectively shunned industries. The purpose of this article is to provide an analysis of whether it makes investment sense to avoid ever investing in such stocks. Toward this end, we chose four industry groups frequently targeted for elimination by SRI funds: alcoholic beverages; defense-related; gaming; and tobacco – collectively referred to hereafter as "the vice sectors."

Fortunately, a tailor-made test exists for the first tier of investigation, the returns themselves. The Domini 400 Social Index, created by the social research firm of KLD Research & Analytics, Inc. ("KLD") is a market capitalization-weighted common stock index. It monitors the performance of 400 U.S. corporations that pass multiple, broad-based social screens. The Index consists of approximately 250 companies included in the Standard & Poor's 500 Index, approximately 100 additional large companies not included in the S&P 500 but providing industry representation, and approximately 50 additional companies with particularly strong social characteristics. It excludes the stocks of companies in all of the vice sectors defined in the previous paragraph, along with the stocks of nuclear power companies. Among the stated purposes of the index is "to answer the question of whether social screening caries an inherent financial cost", according to Domini.

The following bar graph illustrates the annualized performance of the Domini 400 Social Index vs. the S&P 500 Index for multi-year periods.



Using KLD's own standard, it is apparent that not including the vice sectors in the Domini 400's selection set has resulted in some amount of relative return deficiency. Its index underperformed the benchmark index for annualized periods of one, three, five, and ten years ending September 30, 2005. The relative magnitude of the benchmark's out-performance, however, is far less for the ten-year period than in the more recent periods. The five-year period provides a very interesting comparison in that both indexes had negative total returns during the period, but it is obvious that the omitted sectors – principally vice sector stocks as detailed above – had a significantly positive return for the same period. The Domini Index strives for the similar basic risk diversification without vice stocks to the S&P 500 while using 20% fewer issues. In order to algebraically impute the cost of not including vice stocks during the most recent five-year period, assume that the difference in market capitalization between the two is 20%. (In reality it is more, but the extent to which vice is less than 20% of the S&P 500's total capitalization would only strengthen the investment case for including vice stocks). Further assume that the overall portion of return attributable to security selection of the companies included in the Domini 400 but not in the S&P 500 nets out to zero over the five-year period. Using a basic weighted average formula, we can estimate the return of vice during this period by the algebraic expression: 80%*(-2.56%) + 20%* (x) = -1.49%; solving for x, the answer is +5.35%, or 791 basis points higher than the Domini 400.

The cyclical nature of composites not including vice stocks becomes even more striking using year-by-year calendar data, as illustrated below.

Year	Domini Total Return	S&P 500 Total Return	Difference
1992	12.09%	7.68%	4.41%
1993	8.52%	10.08%	**-1.56%**
1994	0.18%	1.26%	**-1.08%**
1995	38.20%	37.50%	0.70%
1996	23.70%	23.07%	0.63%
1997	38.26%	33.40%	4.86%
1998	34.55%	28.58%	5.97%
1999	24.49%	21.04%	3.45%
2000	-14.32%	-9.11%	**-5.21%**
2001	-12.67%	-11.88%	**-0.79%**
2002	-20.10%	-22.10%	2.00%
2003	28.47%	28.69%	**-0.22%**
2004	10.31%	10.88%	**-0.57%**

Following the five-year interval from the beginning of 1995 through the end of 1999 when the Domini 400 Index posted higher rates of return than the S&P 500 each year, the former index posted inferior rates of return during four of the last five years, inclusive from 2000 through 2004. Therefore, analysis of these returns certainly seems to give credence to the hypothesis that excluding the stocks of companies in the so-called vice sectors can have detrimental effects on investment performance potential during some time periods. The next logical step is to compare the underlying fundamental attributes of these stocks with other stocks in an attempt to identify the reasons behind these findings and whether they are likely to be sustainable over time.

The next table provides summary profiles of the investment characteristics of the vice sectors versus a comparative universe of 4800 stocks*.

Cap-Weighted Means of Target "Vice" Sector	# of Members	Value Line Safety Rank	beta (x)	EPS Growth 5-Year (X)	Price to BV (X)	Current PE (X)	Div Yield (%)
Alcohol	21	1.27	0.63	15.7	3.6	16.1	2.1
Defense	117	2.24	0.94	6.4	3.1	16.6	1.4
Gaming	41	3.02	1.03	19.4	4.3	20.2	1.0
Tobacco	11	3.00	0.75	9.2	3.8	15.0	3.9
Vice Composite	**190**	**2.54**	**0.85**	**9.7**	**3.5**	**16.3**	**2.4**
Cap-Weighted Mean of Value Line Extended Universe	**4800**	**2.37**	**1.00**	**9.3**	**3.6**	**17.3**	**1.8**

** for which full records of financial data were available in the "Plus" database distributed 9/30/2005 by Value Line, a veteran New-York-based publisher of financial data; market-cap weighting schemes are used for each subgroup and composite in each category with the exception of number of constituents. For each cell, the sector with the value most representative of growth is colored red and the value most representative of value is colored blue.*

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The following conclusions seem evident:

1. The total Vice Composite portfolio has slightly more attractive investment characteristics than the Value Line Universe in terms of the two valuation categories with a somewhat higher earnings growth rate and a 33.3% more generous dividend yield.
2. Three of the four vice sectors have lower betas than the Value Line Universe as a whole. This would tend to indicate that all four are somewhat defensive regarding market price movements. That is, they would tend go up a less than the market in bull markets, and to go down less than the market in bear markets. This is especially true of alcohol and tobacco.
3. Gaming is the only one of the four sectors valued by the market as a growth sector rather than as a value sector. Indeed, it has the highest five-year EPS growth rate, betas, price-earnings, and price-book multiples, while having the lowest dividend yield.
4. On a P/E multiple basis, the three remaining sectors all are valued less expensively than the broad universe.
5. A disproportionately compelling investment case based upon the above data can be made for the alcohol sector right now with lower-than-average P/E, inline P/B, greater-than-average dividend yield indicating a value sector. Yet, its EPS growth is approximately 60% higher than the average Value Line sector. It also provides relative stability with a low beta and the most attractive Safety Rank according to the Value Line Safety ranking system where "1" is considered most safe and "5" is least safe.
6. Tobacco also has some attractive investment features as a sector despite a much less desirable Safety Rank. Its EPS growth and Price-to-Book multiple are just about in line with the overall averages, but its P/E is the lowest of all the sectors measured and its generous dividend yield is more than double that of the market average.
7. Defense is the broadest sector in terms of constituents. The sector is valued inexpensively by the market, but the sector's dividend yield is not as attractive and its EPS growth rate during the most recent five-year period is about 30% below market.

Therefore, three of our four vice sectors would generally be considered as value, with only gaming qualifying as a growth sector. The two most defensive vice sectors, alcohol and tobacco, presently look particularly attractive in terms of the positioning relative to alternative sectors. Gaming offers competitive growth to other growth sectors with generally lower sensitivity to market price movements while defense seems fairly valued given its below-average EPS growth history.

Although analyzing the fundamental profiles of each sector is useful, such valuation techniques have their limitations. One is the time-period specificity of the data and, therefore, any implications we attempt to derive from such data. Historical spot-checking on similar industry aggregate data reveals that some of the data relationships detailed above do tend to be perennially characteristics of the four vice sector groups. The betas of most alcohol and tobacco companies seem to be dependably below 1.00 during the past 20 years. Their P/E multiples are generally below the market average and their dividend yields are usually higher. Since the evolution of gaming as a distinct publicly traded sector, the stocks of most such companies have persistently offered scant dividend yield and have traded at a higher-than-market multiple to their book values. Most of the other observations, however, vary considerably with time period, most especially earnings-growth rates and all observations about the defense sector.

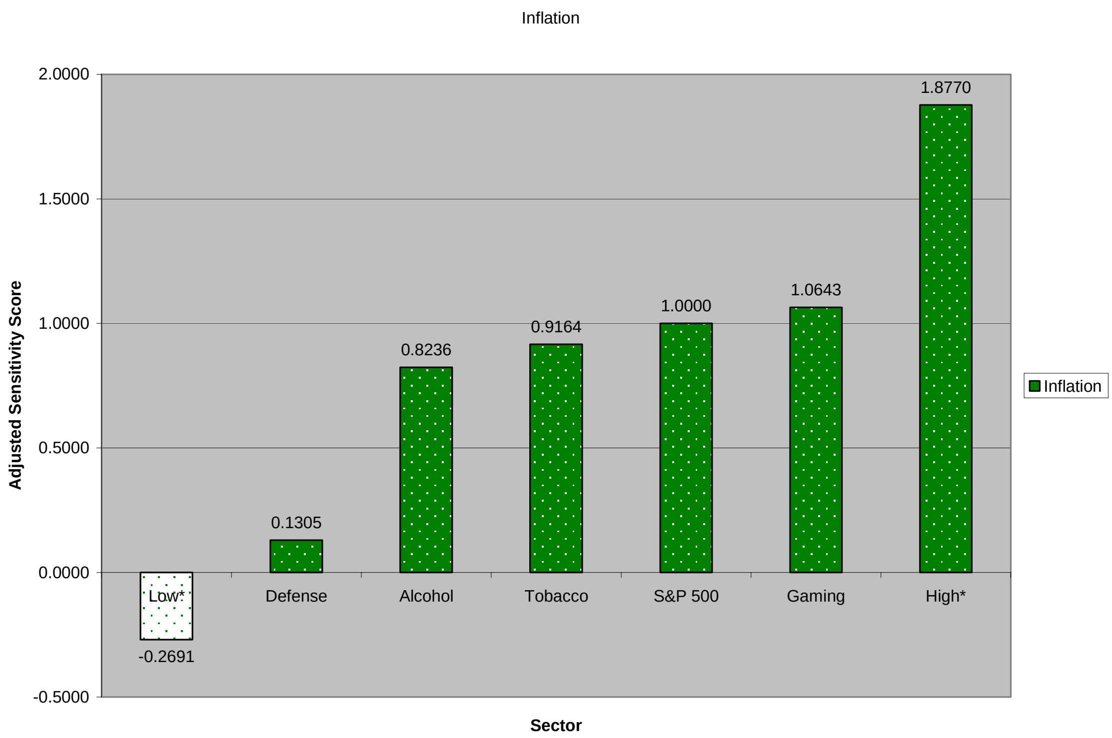
Indeed, many quantitatively based investment strategies have failed to sustain the test of time because they relied on relationships supported primarily by correlation data derived over a specific five- or ten-year period of data. A major problem is that many financial data relationships have been shown to be notoriously unstable over time. For example, in one five-year period, fundamental valuations may be shown to be a primary factor moving the market, but in another five-year period, sensitivity to oil prices may have been far more important. Therefore, processes relying on standard fundamental ratio analysis and correlation data are limited in their usefulness in answering the title question of this article — a perpetual source of consternation to practitioners of Modern Portfolio Theory ("MPT"). In classic MPT, all systematic risk affecting security prices is generally characterized as part of a one-variable beta, measuring that stock's historical sensitivity to market price movements. These betas provide little information, however, about what types of economic conditions tend to favor which types of stocks. Moreover, the same stocks frequently exhibit betas below 1.00 in one five-year measurement period and above 1.00 during a different such measurement period.

Toward this end, we received some assistance from BIRR Portfolio Analysis, Inc. ("BIRR"), a North-Carolina-based firm founded by principals Edwin Burmeister, Roger Ibbotson, Richard Roll, and Stephen Ross, to provide specialized risk-evaluation software and consulting services to the investment community. The analytic software and services provided by BIRR are based upon the Arbitrage Pricing Theory ("APT"), introduced in 1976 by firm principal Stephen Ross., generally characterized. Subsequent research efforts during the past quarter-century have demonstrated that there are four major systematic risk factors derived from economic time series for which investors have been persistently rewarded over time. These include unexpected changes in:

- inflation – as measured by actual inflation rate at end-of-month minus expected inflation rate (at the beginning of the month) measured using a quantitative technique known as Kalman filtering;
- real growth rate of the economy – as measured by changes in the expected inflation-adjusted growth rate of Gross Domestic Product (from the beginning to the end of each month) using a quantitative technique known as Kalman filtering;
- investor confidence – as measured by 20-year corporate bond return minus 25-year government bond return;
- yield curve – as measured by the 25-year US government bond return minus the 30-day Treasury bill rate.

The sensitivity coefficients of stocks to all of these factors have been demonstrated to be far more robust over time than MPT betas. Furthermore, once these sensitivities have been accounted for, the APT-measured sensitivities to market price movements also tend to be more persistent over time. Using the APT analysis supplied to us by BIRR, we can address the question of "when is vice nice for investment portfolios?" with greater confidence. The graphs below all reflect a linear transformation used to standardize all S&P 500 sensitivities at 1.00.

Regarding sensitivity to inflation, certainly a concern in today's market environment, the following graph provides perspective on how the four vice sectors compare with the overall market.



To interpret the investment implications of this chart, the numeric coefficient of each sector's sensitivity is unimportant compared to its relative position to the market. The low and high bars refer to the 59 S&P 1500 industries classified under the Global Industry Classification Standard ("GICS"). "Low" designates the most inversely sensitive industry, that is, the industry that tends to fare best when the unexpected change in the sensitivity factor is high, and "High" is the industry that fares worst when the unexpected change in the sensitivity factor is high. In the case of inflation, it is not surprising that the low industry is Energy Equipment and Services while the high industry is Airlines. Moving to the vice sectors, defense tends to perform much better than the average industry when inflation is unexpectedly high. Under the same conditions, alcohol and tobacco tend to perform somewhat better than average. On the other hand, gaming should potentially be avoided if an inflation shock wave hits the U.S. economy.

Switching focus to the business cycle yields the following results:

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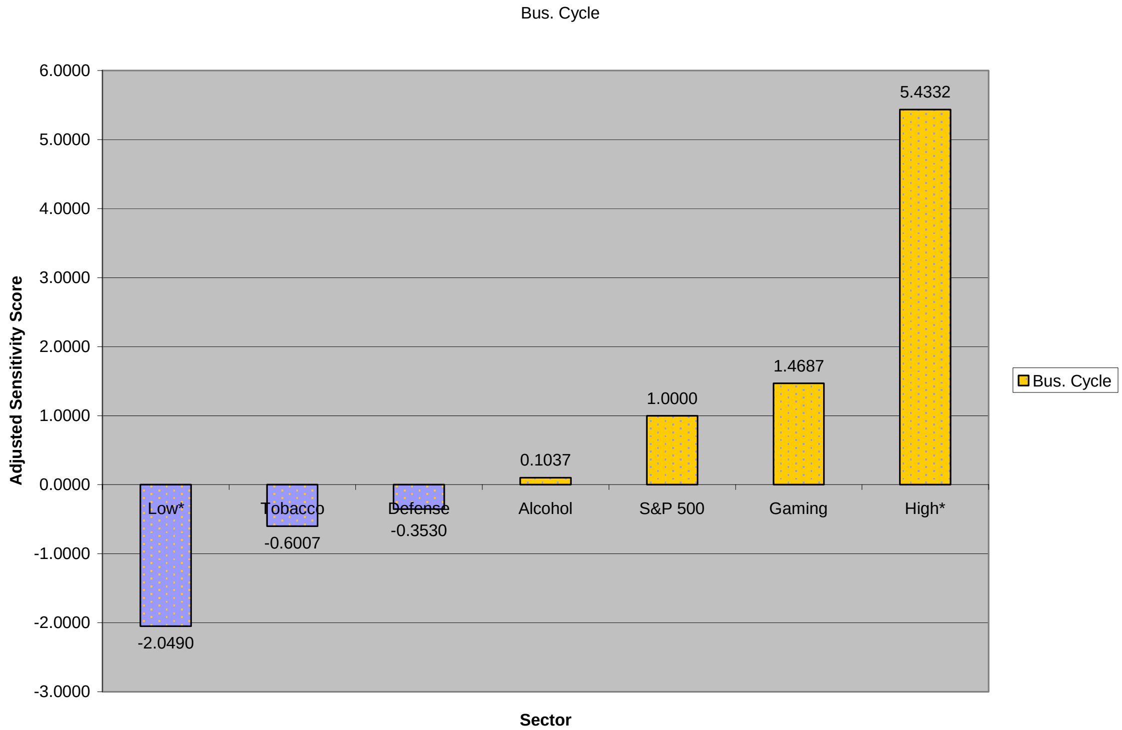
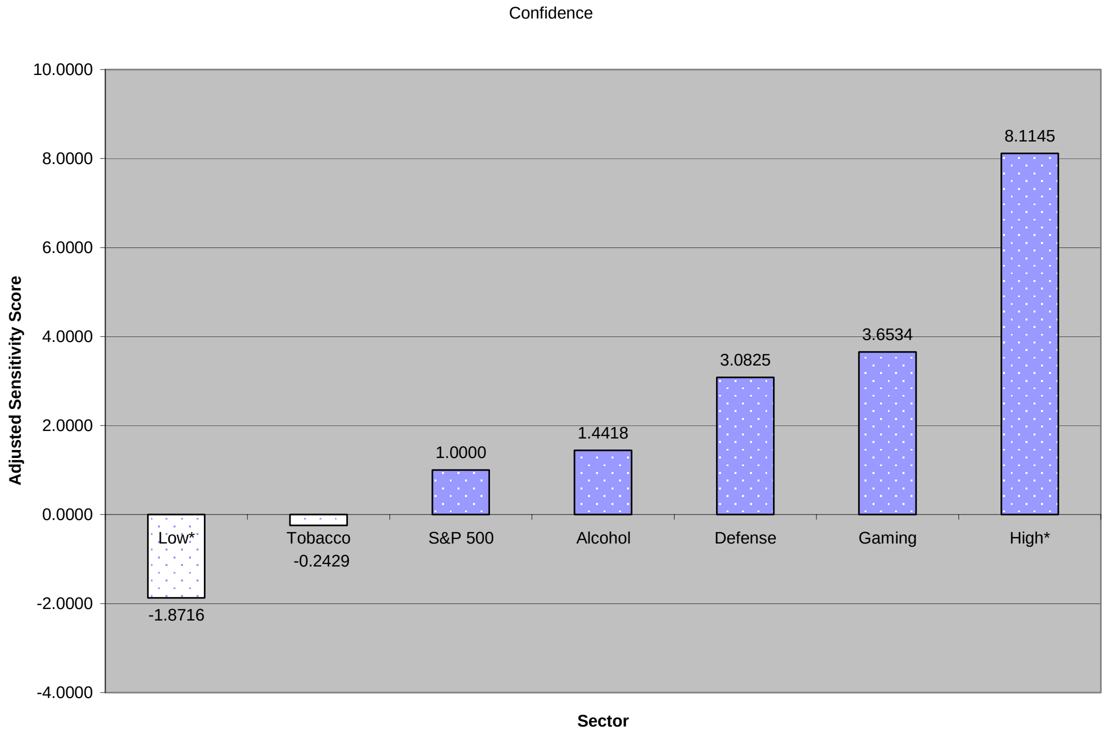


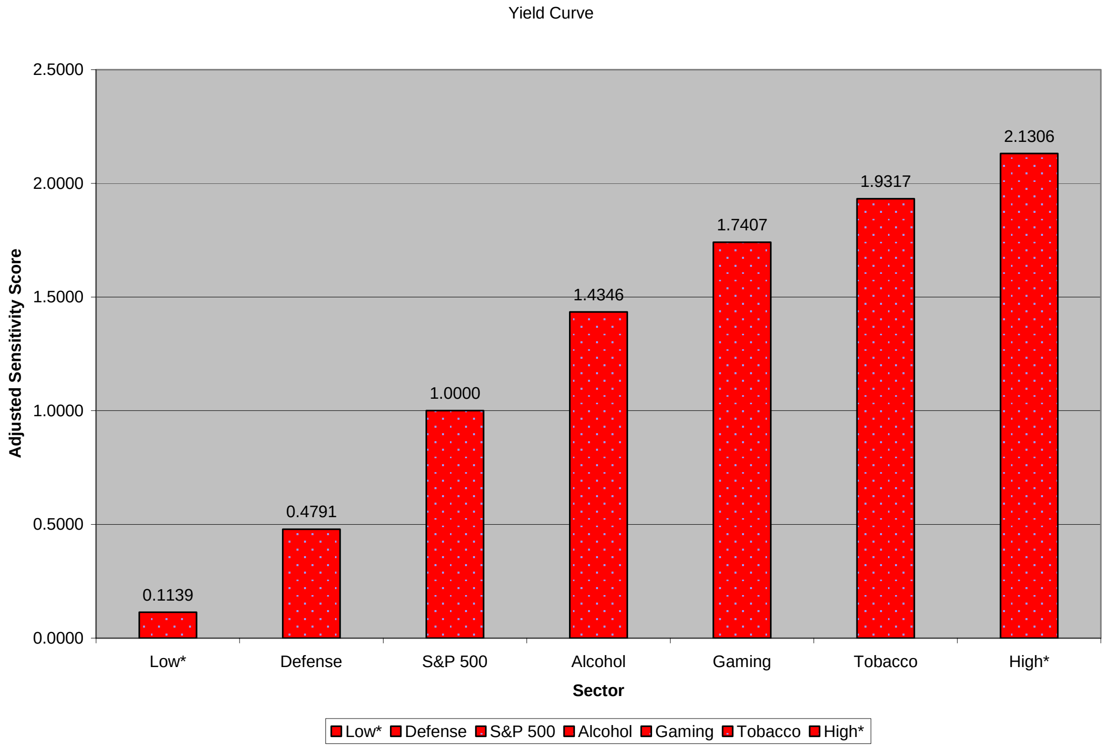
In this case, the GICS industry that benefits least when the U.S. Business Cycle unexpectedly turns brisk is Thrifts/Mortgage Finance. Telecommunications and semiconductor companies bracket the other end of the spectrum. Three of four the vice sectors demonstrate below average sensitivities to GDP shocks and surprises; this trio includes: tobacco; defense, and alcohol. This is consistent with them generally being regarded as "defensive" sectors that are relatively insensitive to cyclical shifts in the economy. Gaming, once again, is the notable exception. Economic upturns generally spur above-average profits for gaming companies.

The third APT sensitivity factor we investigate is investor confidence. Immediately evident from the graph below is that this factor gives rise to the broadest spectrum from low (Water Utilities) to high (Internet Services) values among the GICS industry sectors.



Only the tobacco industry is less shaken this time, however, by unexpected declines in investor confidence than the S&P 500 Index. Somewhat surprisingly, the stocks of alcohol companies are not immune from such jolts although they are less sensitive to them than either defense or gaming companies. In general, the most sensitive sectors include the various technology-related sectors and the providers of “big ticket” items such as automobiles, furniture, and the airline industry. Besides tobacco and utilities, other relatively immune sectors include health care providers and pharmaceutical companies. In other words, the more inelastic the demand for the product or service, the more immune the sector; the inverse of this statement also applies.

Finally, moving from the broadest spectrum to the narrowest, sensitivity to relative steepness of the yield curve is the most closely bunched distribution, as shown below:



The low end of the sensitivity spectrum includes credit card and insurance companies, consumer staples, and health care services. High sensitivities include companies with high capital expenditures such as household durables, utilities, and automobiles. The factor sensitivities of the vice sectors are far less distinctive than with the other three factors analyzed above. One could also argue that they are the least intuitive. For example, tobacco is the eighth most sensitive sector among the 61 GICS groups even though other inelastic-demand consumer staples are all among the least sensitive. This may be due to the funding requirements that many of the companies must satisfy on their long-term legal liabilities. On the other hand, although virtually all the other sectors characterized by “big-ticket” items and expensive inventories have high sensitivities on this factor, the defense sector has the lowest sensitivity among the vice sectors. Having its revenue streams relatively independent of the private sector may be a principal reason behind this somewhat counterintuitive result. Among the four APT factors, yield-curve sensitivity makes the weakest case for resilience over time for the distinct and favorable investment characteristics of the three most defensive of the vice sectors. Despite this, however, when taken together, the analyses of the other three sectors still make very compelling cases for continued robustness.

Beyond including individual issues, mutual fund investors who believe that it is possible to identify when the US economy and/or capital markets will be experiencing such conditions have another interesting option. Mutual Advisors Inc. manages a mutual fund that invests in the stocks of companies in the vice sectors using a definition very similar to the ones used in this article named, appropriately enough, "the Vice Fund" with "VICEX" as its ticker. The no load, multi-cap fund seeks long-term growth of capital by investing at least 80% of its assets at all times in the stocks of vice companies.

A more passive way of attempting to isolate an investment in vice stocks is to use the *iShares* family of exchange-traded funds (ETFs), sponsored by Barclays Global Investors. Among the many iShares offered, one has a ticker symbol IVV that is designed to replicate the price and yield performance of the S&P 500, while another has a ticker symbol KLD that replicates the price and yield performance of the KLD Select Social Index. By going long the former and short the latter, the investor's net exposure would be primarily, albeit not purely, toward vice sectors.

The implications for investors appear to be fairly straightforward. Mathematically, the most compelling findings presented in this article are those documenting the relative cyclicality of vice sector performance. Eliminating the companies of stocks in the so-called vice sectors may still be the right thing to do for some investors from the perspective of individual values. It is important to be aware, however, that such a policy is likely to have a negative effect upon potential investment returns during certain time periods. This is most especially true during periods characterized by relatively low returns and periods with relative stagnancy, or worse, in the U.S. economy. In sum, ignoring the wisdom of Ecclesiastes presented in the opening sentence may result in maintaining portfolios that perform better than average during relative boom periods with the cost of bearing a heavier brunt than most during less opportune times.

Definitions of terms. Beta: A mathematical measure of the sensitivity of rates of return on a portfolio or a given stock compared with rates of return on the market as a whole. EPS: Also known as "Earnings per share" An earnings measure calculated by subtracting the dividends paid to holders of preferred stock from the net income for a period and dividing that result by the average number of common shares outstanding during that period. Price to BV: a ratio comparing the market price of a firm's common stock with the stock's book value or its shareholders' equity on a per share basis. PE: A common stock analysis statistic in which the current price of a stock is divided by the current (or sometimes the projected) earnings per share of the issuing firm.